

REMARKS

This application pertains to a novel nanofiltration membrane for use in organic solvents.

Claims 1-3 and 5-22 are pending; claim 4 being cancelled by this amendment. The limitations of claim 4 have been added to claim 1, making claim 1 an independent form of claim 4.

Claims 8-11 and 20-22 have been withdrawn from examination as directed to non-elected subject matter, so that the claims under examination are claims 1-3, 5, 7 and 12-19.

Applicants respectfully request that upon the allowance of claims drawn to the elected subject matter, the non-elected subject matter be rejoined.

In addition to the amendment mentioned above, claim 1 has also been amended to recite that the pore surfaces are modified by chemical bonding of a hydrophobing agent selected from the group consisting of the recited silanes. Support can be found in the specification at page 4, lines 32 - 35. No new matter is added.

Claim 1 has also been further amended to replace the transitional term "comprising" with --consisting essentially of--.

Claims 1-6 and 12-19 stand rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over, Van 'T Veen et al (US 5,089,299).

The Van 'T Veen reference requires that a microporous layer be firmly bound to a porous support. The membrane of the Van 'T Veen reference is a composite of a ceramic support, and a separate layer of microporous material on top of that support (see Fig. 1). Applicants' membrane, by contrast, is not a composite but consists essentially of a ceramic membrane having pore surfaces which are modified by reaction with a silane to make them hydrophobic. This is different than a composite, which by definition comprises sections of different materials. Hawley's Chemical Dictionary, fourteenth edition, defines a composite as:

"A mixture or mechanical combination on a macroscale of two or more materials that are solid in the finished state, are mutually insoluble, and different in chemical nature..."

The chemical properties of Applicants' pore surfaces are modified, but Applicants' membrane is a single material and not a combination of two or more materials, as is the Van 'T Veen membrane. Van 'T Veen's microporous layer is excluded by the "consisting essentially of" language of Applicants claims.

Applicants' membrane is therefore different than that of the Van 'T Veen reference. In addition, there is nothing in the Van 'T Veen reference that would teach or suggest the changes that would be required to arrive at Applicants' novel membrane.

The rejection of claims 1-6 and 12-19 under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over, Van 'T Veen et al (US 5,089,299) should therefore be withdrawn.

Claims 1-7 and 12-19 stand rejected under 35 U.S.C. 103(a) as obvious over Van 'T Veen et al (US 5,089,299) in combination with Hying et al (US 6,383,386).

The differences between Applicants' novel membrane and anything that can be found in the Van 'T Veen reference have been discussed above.

The Examiner cites the Hying reference as teaching a method for hydrophobing membranes with silanes and believes that somehow this hydrophobing method will convert the membrane of the Van 'T Veen reference to Applicants'.

Initially, of course, it must be observed that irrespective of whether or not Van 'T Veen's membrane is treated with the silanes of the Hying reference, nothing in this combination of reference would teach or suggest the elimination of the hydrophobic layer of the Van 'T Veen reference. To remove this layer would be contrary to the teaching of the Van 'T Veen reference.

Further, the membrane of the Hying reference is also a composite material (col. 1, lines 56-63, col. 2, lines 4-10), and not just a ceramic membrane having specific pore surface properties, such as is Applicants' membrane. Hying's composite material is coated with hydrophobic layers (col. 2, lines 39-41).

The membrane of the Hying reference is a porous support which is provided on at least one side and on the interior thereof with at least one inorganic component (col. 1, lines 48-51). The inorganic component exhibits hydrophobic properties (col. 1, line 63).

The composite membrane is formed by applying a suspension of the inorganic component to a porous support and solidifying (col. 1, line 66-col. 2, line 5). A composite is thus formed.

This composite, i.e., the porous support with the layer of inorganic component applied from suspension, is then treated with a solution containing at

least one hydrophobic substance (col. 4, lines 57-59). The hydrophobic substance can be a silane (col. 4, lines 1-2).

Nowhere, however, does either the Hying reference or the Van 'T Veen reference teach or suggest directly treating the support itself with a silane, without first coating it with an inorganic layer. Hying's membrane, as well as that of the Van 'T Veen referenece, always has a coating of a further substance.

This is in stark contrast to Applicants' membrane, where the pores of a ceramic membrane (comparable to the support of the referneces) are made hydrophobic by treatment with a hydrophobing agent.

The membranes of both references are composite materials, Applicants' is not.

No combination of these two references could ever lead to Applicants' novel ceramic membrane, having pores which have been made hydrophobic by reaction with a silane.

Applicants' claims cannot therefore be seen as obvious over the cited combination of references, and the rejection of claims 1-7 and 12-19 under 35 U.S.C. 103(a) as obvious over Van 'T Veen et al (US 5,089,299) in combination with Hying et al (US 6,383,386) should therefore now be withdrawn.

In view of the present amendments and remarks it is believed that claims 1-3 and 5-22 are now in condition for allowance. Reconsideration of said claims by the Examiner is respectfully requested and the allowance thereof is courteously solicited.

CONDITIONAL PETITION FOR EXTENSION OF TIME

If any extension of time for this response is required, Applicants request that this be considered a petition therefor. Please charge the required petition fee to Deposit Account No. 14-1263.

ADDITIONAL FEE

Please charge any insufficiency of fee or credit any excess to Deposit Account No. 14-1263.

Respectfully submitted,
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